SPECIFIC COMMENTS
TECHNICAL MEMORANDUM 12, OPERABLE UNIT 5
HUMAN HEALTH RISK ASSESSMENT EXPOSURE SCENARIOS

1. Page 4-3, Section 4.4. The text states, "Dermal contact with soil will be assessed quantitatively only if sampling results from the OU 5 Phase I investigation demonstrate the presence of organic chemicals of concern in surface soil samples at concentrations exceeding background levels." This approach is inappropriate for two reasons (EPA 1989a). First, all chemicals of concern (COCs) should be evaluated for every appropriate pathway. Second, unlike inorganic chemicals which naturally occur, EPA considers all organic chemicals to be anthropogenic. Thus, there are no background concentrations to which levels of organic compounds can be compared. As a result, dermal contact should be considered in the quantitative analysis.

2. Pages 4-5 through 4-6, Section 4.5.1. The text lists pathways considered negligible and that therefore will not be evaluated in the risk assessment. These pathways include ingestion of homegrown meat products for on- and off-site residents, and exposure to groundwater for all receptors. The ingestion of homegrown meat may be justifiably eliminated if the contaminants of concern for OU 5 can be demonstrated to have very low plant uptake factors. The rationale for elimination of this pathway should be forwarded after the contaminants of concern have been chosen. Groundwater exposure pathways must be evaluated for future onsite receptors. Although groundwater is currently not used on the site, it may be used as a drinking water source in the future. Arguments presented in Appendix A concerning domestic water production capabilities of the aquifer underlying OU 5 are not convincing. Our technical review of the simulation results is attached (Enclosure 2). We require that domestic use of on site groundwater be included in the onsite residential scenario.

3. Page 4-9, Section 4.5.2.1. The text indicates that external radiation exposure from wind- dispersed radionuclides will not be addressed quantitatively for current off-site residential receptors. Exposure to wind-dispersed radionuclides includes exposure to external gamma radiation, which is part of a comprehensive exposure pathway for off-site residential receptors (current and future) and should be quantitatively assessed in the risk assessment.

4. Page 4-8, Last Paragraph through Page 4-9, Second Paragraph. Surface deposition of particulates on vegetables is listed as the only contaminant exposure for homegrown vegetable ingestion. Consideration of plant uptake of chemicals in the soil will complete this exposure pathway and should be included in the quantitative assessment of both fruit and vegetable ingestion for on- and off-site residential receptors for those contaminants of concern with sufficiently high plant uptake factors. Elimination of this pathway may be justified based on evidence of low uptake factors. Such rationale should be forwarded to EPA after the contaminants of concern have been chosen for OU 5. Otherwise, the pathway should be quantitatively evaluated.

5. Page 4-10, Section 4.5.2.2. Surface water contact and incidental surface water ingestion have incorrectly been excluded as exposure pathways for the current on-site worker. Incidental ingestion of and dermal contact with surface water should be assessed. These pathways should also be assessed for future construction workers.

6. Pages 5-3 and 5-4, Section 5.1.1. Several of the generic exposure assumptions are not consistent with those conventionally used at Superfund sites. The RME exposure frequency for the future on-site ecological researcher should be 5 days per week for 50 weeks per year for 25 years. Exposure time should be 8 hours per day. Exposure frequencies should not be adjusted for snowfall because potential exposures are likely to occur despite snow cover.

7. Pages 5-4 through 5-5, Section 5.1.2. The inhalation rate for the construction worker should be 1.67 cubic meters per hour (m^3/hr); for the ecological worker, the rate should be 1.25 m^3/hr; and for the office worker, the rate should be 0.83 m^3/hr. The soil ingestion rate for a construction worker should be 480 mg/day. The value in the TM is 50 mg/day which is sufficient for an office worker. However, for a construction worker, the higher value should be used. Also, the ecological worker should be assumed to be on-site for 8 hours per day instead of 4 hours per day; the duration should be 24 hours per day instead of 16 hours per day for residents. A lung deposition factor of 75 percent is proposed. Deposition factors depend on a number of variables, including aerodynamic particulate diameter and concentration of this fraction in ambient air. Data supporting the deposition factor used in the risk assessment should be provided, or the factor should be removed from the intake equations.

8. Pages 5-5 through 5-6, Section 5.1.3. The text proposes using a "fraction ingested from contaminated source" factor to modify soil ingestion based on the amount of time spent outdoors. The use of this fraction is inappropriate and could underestimate soil intake. The soil ingestion input parameters from the Risk Assessment Guidance for Superfund (RAGS) (EPA 1989a) or the Exposure Factors Handbook (EPA 1989b) include ingestion of indoor dust, which should be considered to have contaminant concentrations equal to outdoor soils. A factor for fraction ingested should not be used in determining chronic daily intake from soil.

9. Page 5-6, Section 5.1.3. The text indicates that a matrix effect, indicating bioavailability of chemicals in soil, will be used in determining chemical intake from soil ingestion. Bioavailability factors are chemical-specific and depend on the particular soil-chemical matrix in which the chemical is ingested. These factors are widely variable for each chemical. Unless sufficient information can be provided to substantiate chemical-specific bioavailability, this factor should be eliminated from the soil intake equation.

10. Page 5-7, Section 5.1.4. The use of a matrix factor to account for bioavailability of contaminants deposited on the surface of homegrown produce is inappropriate. Although it is possible that contaminants taken up by plants and incorporated into the structural plant parts may be less bioavailable than particulates on the surface of plants, little information regarding this issue is available. However, particulates deposited on the surface of a plant are not covalently bound and should be assumed to be available for absorption in the gastrointestinal tract. Therefore, a reliable matrix factor cannot be estimated and should be eliminated from the intake equation, unless additional scientific information can be provided. Also, the use of a 50 percent reduction of contaminant concentration for "washoff" is inappropriate and should be eliminated from the equations.

11. Page 5-8, Section 5.1.5. The exposure to surface water/sediment should be 50 milliliters per hour (ml/hr) for 2.6 hr/day, not 50 ml/day as stated in the text. The stated ingestion rate is less than half the rate recommended by EPA. Also, the RME exposure frequency should be 21 days per year, not 7 days per year. The stated exposure frequency is one-third the recommended RME value.

12. Page 5-8, Section 5.1.6. The RME surface area for dermal exposures (residential) should be 5,300 square centimeters (cm^2) (RME for face, arms, and hands (EPA, 1989b)) not 4,140 cm^2 as stated in the text.

13. Page 5-9, Section 5.1.6. The soil adherence factor should be 1.0 milligram per square centimeter (mg/cm^2) (EPA, 1989b), not 0.5 mg/cm^2 as stated in the text. The term "fraction exposed from contaminated medium," should be eliminated from this equation. Exposure should depend on the amount of time spent in the area, which in this case is at least 8 hours per day.

14. Tables 5-1 through 5-21. The following exposure pathways were not assessed for OU 5. These pathways are required for OU 5 unless specific reasons for their exclusion can be provided.

    Residential

    Groundwater ingestion
    Dermal contact with surface water and sediments
    Inhalation of vapors inside the residence
    Inhalation of vapors while showering
    Dermal contact with groundwater

15. Tables 5-1 through 5-33. The summary tables reflect inaccuracies noted in the text and should be corrected to incorporate the previous comments.

4.0 REFERENCES

U.S. Environmental Protection Agency (EPA). 1985. "Rapid Assessment of Exposure to Particulate Emissions from Surface Contamination Sites." U.S. Environmental Protection Agency, Office of Health and Environmental Assessment, Washington, DC. EPA/600/8-85/002.

EPA. 1989a. "Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part A). Interim Final." U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Washington, DC. EPA/540/1-89/002.

EPA. 1989b. "Exposure Factors Handbook." U.S. Environmental Protection Agency, Office of Health and Environmental Assessment, Washington, DC. EPA/600/8-89/043.

EPA. 1992. "Health Effects Assessment Summary Tables." Office of Health and Environmental Assessment, Environmental Criteria and Assessment Office, Cincinnati, OH. OERR 9200.6-303 (92-1).

EPA. 1993. "Integrated Risk Information System." U.S. Environmental Protection Agency, Office of Health and Environmental Assessment, Office of Research and Development. Washington DC.